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BERTHOLD NEUMOEGEN.

Mr. Neumoegen died at his home, in New York, on January 21st of consumption, hastened by an attack of grip. His suffering during the last two weeks of his life was very great, and he looked upon death as a relief. He was born at Frankfort, on the Main, Germany, Nov. 19, 1845. He received a very good education, and his friends and schoolmates always spoke of him as one of the brightest of boys. He was a great linguist, speaking five or six languages fluently, and never tired of discoursing on his favorite subject—Lepidoptera. When a small child his greatest pleasure was to run in the fields with his butterfly net and catch his beloved insects. He began his collection about twenty-one years ago, little dreaming of the extent to which it was destined to grow, but his love and enthusiasm increased every day, and he really added to his collection until the very last day of his life. His love for the butterflies was so great that, when working in his room with his assistant Mr. Doll, he would forget all about his illness and every other trouble and was really happy. One of Mr. Neumoegen's characteristics was his extreme liberality in allowing students to study the rich material in his magnificent collection, and as a consequence it contains many valuable types

described by our most prominent lepidopterists. In this connection Dr. Herman Strecker wrote of him: "When my friend Neumoegen, some years ago, commenced to study and collect Lepidoptera, to which he applied himself with an energy seldom equaled, I impressed on him the importance of obtaining examples from Arizona, giving him drawings of *Arg. nokomis* and other rare species. By indefatigable industry he secured collectors who, from inner Arizona, in a remarkably short time sent a large quantity of the most interesting material, among which were *Smerinthus imperator* and the coveted *nokomis* in both sexes, as well as numbers of others new to science. I cannot omit mentioning another still more astonishing thing in connection with the reception of these Arizona novelties which, incredible as it may appear, is nevertheless a fact, to the truth of which I am willing to at any time to be qualified with proper jurat appended; it is when Mr. Neumoegen passed them to me he did not even hint, let alone make it a condition, that any of the new species should be named after himself, his wife, his aunts, or his cousins-german, his grandparents, the stranger within his gates, or even after his rich neighbor." He was an indefatigable collector, and, as a result, was the possessor of one of the finest collections of Lepidoptera in the world. Mr. Neumoegen was also a well-known writer on his specialty, and described many new genera and species from this country and the West Indies, and of late years has published a number of valuable papers on the Bombycidæ in conjunction with Mr. H. G. Dyar. He was engaged in business as a banker and broker at No. 40 Exchange Place, and was a member of the New York Stock Exchange. Mr. Neumoegen will be greatly missed among his lepidopterological brethren and co-workers, and his wife and children will have the sympathy of his scientific friends in their irreparable loss.

In 1835, a plague of locusts made their appearance in China, in the neighborhood of Quangse, and in the western departments of Quangtung. The military and people were ordered out to exterminate them, as they had done two years before. A more rational mode, however, was adopted by the authorities, of offering a bounty of twelve or fifteen cash per catty of the insects. They were gathered so fast for this price, that it was immediately lowered to five or six cash per catty. A strike followed, and the locusts were left in quiet to do as much damage as they could.—*Cowan's Curious Facts.*

IGNORANCE OF THE KNOWLEDGE OF ENTOMOLOGY IN THE YEAR OF 1853.

By T. B. ASHTON, Tonganoxie, Kan.

It may be of interest to the readers of ENT. NEWS to know the opinion of so well informed and truthful an entomologist as the late Dr. Fitch, who had ample facilities to make correct observations as to the existing ignorance on the subject of insects and their habits, that was generally prevalent in this country six years prior to the organizing of the Entomological Society of Philadelphia. I make the following extract of a letter written by Dr. Fitch to Mr. Johnson, and first published in the "Journal" of the New York State Agricultural Society, July, 1853. Since the date of this letter, his seventeen years' of labor as New York State Entomologist, did very much to educate and enlighten an ignorant public on the subject of Entomology, and great credit is due to his industry in spreading through the land a correct knowledge of insects during his useful life. Forty-one years have passed since this letter was written, and what a wonderful contrast—the ignorance of Entomology at that time and the general knowledge of it to-day!

"SALEM, N. Y., June 30th, 1853.

"Hon. B. P. JOHNSON—

"My Dear Sir: * * * * * *

"But a still more remarkable instance of the excessive multiplication and consequent havoc caused by an insect not previously noticed has occurred in this vicinity since I received your letter. Indeed, it surpasses everything of the kind that has hitherto been experienced in this county since the date of its settlement. On the 19th inst. a man from Cambridge inquired of me whether I had observed the worms upon the apple trees, saying that all the orchards in that town were being stripped of their leaves. Next day, on going to my apple trees, I found the worm alluded to, upon all of them, committing great havoc; and a gentleman from the Argyle informed me that within two or three days past they had been observed overrunning all the apple trees there. Upon the 23d inst. the Circuit Court being in session in the village of Salem, I saw persons from most parts of the country, and learned that this worm was ravaging every orchard within our borders without exception. Some idea of the value of our orchards and the amount of damage which this pest threatens to do us may be formed from the fact that, two years ago, to supply the vacancies produced by trees that had perished, and to plant new orchards upon some farms, an agent from one single nursery disposed of young trees in their county to the amount of $10,000. As it well may, therefore,

this worm forms the leading topic of conversation in every circle, and our newspapers are giving notices of it in their columns. And the crude and erroneous notions that are being formed and circulated respecting it show, in a most humiliating manner, the gross ignorance which pervades our country upon topics of this kind. One gentleman tells me that in a conversation with the most noted and experienced nurseryman in our county they had mutually come to the conclusion that this worm had been bred by what in his neighborhood is termed 'the little green insect.' On enquiring I ascertained that this little green insect, so named because they knew no other name for it, was nothing more or less than *Aphis mali*, or Apple-leaf Louse. And the idea that this louse breeds these worms is rather more wild than it would be to conjecture that fleas breed bed-bugs. One of the most intelligent and successful farmers, who sometimes wields his pen as well as his scythe and hoe, favored me with the *recherche* information that this is the 'canker worm,'—at least, said he, it is the very same worm that was called the canker worm in Connecticut when I was a boy. Had my good friend asseverated that the moon was made of green cheese he would scarcely have surprised me more. I overheard another gentleman who is a graduate or one of our best colleges recommending to another similarly educated citizen to bore his apple trees, fill the hole with sulphur and close it by inserting a plug 'made from the wood of the same tree.' Methought he ought to have added that the hole should be made with 'a silver bullet,'—or at least that this operation should be done 'in the old o' the moon.' Friend Johnson, posterity will only need what I have above stated to show them that mauger all our vaunted light and intelligence in this, one of the most important branches of natural science to the farmer, and one of the most interesting departments of Nature's works to every studious and enquiring mind, our country at the present day is sunk in Egyptian darkness. In diffusive information, as far as it respects Entomology, we are lagging far behind the subjects of several of the monarchical and despotic governments of the old world. In Germany and Prussia, countries which are regarded as much less enlightened than our own, not merely is a professor of this science deemed indispensable in every university and every agricultural seminary, but its rudiments are taught in all their primary schools. In this country, on the other hand, such a thing as a course of lectures upon this science has never yet been delivered, except, perhaps, in one or two of our universities. Indeed, much of the very foundation of this science, upon this side of the Atlantic, is yet to be laid. Whole groups and families of insects have never been examined. We have not names even by which to designate a considerable portion of our species. Take this apple tree worm, for instance. It belongs to a family of insects of which, in Great Britain, there are upwards of 300 species. Our own country, we may safely assume, contains at least double that number. And of our 600 American insects of this family how many, think you, have been examined and described? So far as I am able to ascertain there are *three* species *only!*

In no other department of science is an exploration so urgently required, so loudly called for, as in this. Scarcely a week passes but that one and another within the circle of my acquaintance is coming to me with some insect which he has detected preying upon some article of property—of which insect he is anxious to know the name, habits and remedies. Within the last forty-eight hours one has brought me a worm which is infesting the roots of his squashes, melons and cucumbers, and has killed a large number of these plants in his and his neighbors' gardens; another has shown me some pea-pods containing a worm which is devouring the young peas; a third has brought in some tomato plants wilted and destroyed by a grub that has perforated the stalk; and a young lady has submitted to my notice some caterpillars which she finds devouring her roses. Such facts forcibly show how much, how very much, we need a thorough investigation of the Entomology of our country. It is indeed surprising that this branch of natural science, in an economical aspect second to no other in its importance, should have remained to this day so lamentably neglected. In that valuable series of volumes of Natural History of the State of New York we are presented with a full description of every object in the animal, vegetable and mineral kingdom, that exist without (= within (?)) our borders, save only our insects. This most important hiatus remains to be filled to complete that great work and render it full and entire as it was designed to be. Each succeeding year is showing how urgently we need the information which this part of that work would furnish. Why should its completion be longer delayed? The pecuniary loss which we shall sustain the present year from this one insect which is now devastating our orchards is probably greater than will be the whole cost of a survey of the insects of the State.

"* * * * * This moth pertains to the genus *Argyro·lepia* and the subgenus *Lozopera* of the distinguished British entomologist, Mr. Stephens. And as this species does not appear to have been hitherto described I propose to call it the *Argyrolepia pomariana*, the specific name being derived from the Latin: *pomarium*, which, translated, will give us for the common name of this insect, the *Orchard Moth*, or if we wish to be more definite, the *Orchard Argyrolepia*."

* * * * * *

Yours Truly,

ASA FITCH.

WE are the army of the great God, and we lay ninety-and-nine eggs; were the hundredth put forth, the world would be ours—such is the speech the Arabs put into the mouth of the locust. And such is the feeling the Arabs entertain of this insect, that they give it a remarkable pedigree, and the following description of its person: It has the head of the horse, the horns of the stag, the eye of the elephant, the neck of the ox, the breast of the lion, the body of the scorpion, the hip of the camel, the legs of the stork, the wings of the eagle, and the tail of the dragon.—*Cowan's Curious Facts.*

NOTES ON TYPES OF NORTH AMERICAN GEOMETRINA IN EUROPEAN COLLECTIONS.—IV.

By GEO. D. HULST.

(Continued from page 44, vol. vi, ENT. NEWS)

Melanippe concordata Wlk. 1295, is the same as *obductata* Moesch.

Camptogramma fluviata Hbn. has as synonyms, *C. lapillata* Gn. ii, 430, from Abyssinia; *C. baccata* Gn. ii, 430, from Ceylon; as well as the following from North America: *Cidaria peracuata* Wlk. 1421, *Coremia abruptata* Wlk. 1713, *C. alternata* Wlk. sup. 1681, *C. pigrata* Wlk. sup. 1681, *Camptogramma exagitata* Wlk. 1331, and *Camptogramma? signataria* Wlk. 1718. There is also a specimen of the same called *plemyrata* Feld., but I do not know whether it is correct.

Cidaria inclinata Wlk. 1727, is a synonym of *C. ferrugata* L.

The type of *Psychophora sabini* Curtis is in the Museum. The middle band of the fore wings is quite distinct, and it differs very much from the "seal brown" immaculate form which Dr. Packard had from Polaris Bay. Var. *frigidaria* Gn. ii, 269, is, I think, not different from the blackish form described by Dr. Skinner as *Glaucopteryx immaculata*. There are some specimens in the Museum among a number taken in Grinnell's Land which closely approach the form which Dr. Packard had.

Larentia ziczacata Wlk. 1185, *L. placidata* Wlk. 1186, and *Lobophora incommodata* Wlk. 1259, are the same as *Spargania magnoliata* Gn. ii, 455.

Thera congregata Wlk. 1264, is a much rubbed specimen of *lacustrata*, or *unangulata*, probably the latter.

Tephrosia comptaria Wlk. 406, is *Epirrita perlineata* Pack. *Melanthia condensata* Wlk. 1273 is the same species, but the type is faded and rubbed.

Tephrosia scitularia Wlk. 406, is *Epirrita cambrica* Curtis.

Eupithecia implicata Wlk. 1241, is not the same as *E. miserulata* Grt. I so determined it from a picture made from the type, but I was wrong. The species are very like each other, but distinct.

Eupithecia anticaria Wlk. 1241 and *E. explanata* Wlk. 1242, are the same.

Thalera superata Wlk. sup. 1612, is a synonym of *Nemoria pistacearia* Gn. i, 348.

Nemoria incertata Wlk. 1557, is the same as *N. gratata* Pack. and *N. oporaria* Zell.

Geometra mimicata Wlk. sup. 1600, is the same as *Synchlora rubivora* Riley, and is a synonym of *Aphodes glaucaria* Gn. i, 377.

Synchlora liquoraria Gn. i, 375, is *S. tricoloraria* Pack.

Iodis tractaria Wlk. 540, is the same as *Aplodes mimosaria* Gn. i, 377, which is probably the same as *Geometra ærata* Fabr.

Nemoria denticularia Wlk. 536, is the same species as *Synchlora excurvaria* Pack.

Racheospila lixaria Gn. covers *R.? extremaria* Wlk. 584, *Geometra inclusaria* Wlk. 508, *G. congruata* Wlk. 511, *Aplodes rubromarginaria* Pack. and *Racheospila cupedinaria* Grt. The type of *R. cupedinaria* is in the Museum.

Anisodes bifilata Wlk. 1585, is *Aplodes brunnearia* Pack. and is itself a synonym of *Nemoria bistriaria* Hbn.

Nemoria indiscriminata Wlk. 1556, *N. densaria* Wlk. 1557, and *Thalassodes deprivata* Wlk. 1559, are synonyms of *Nemoria chloroleucaria* Gn. i, 351.

Nemoria phyllinaria Zell. is the same as *N. zelleraria* Pack.

Geometra iridaria Gn. i, 344, is *G. rectaria* Grt. Mr. Grote's type is in the Museum. *Geometra remotaria* Wlk. 530, is the name for the insect which is called *G. iridaria* Gn. in our collections.

Some specimens have been sent me by Prof. Riley which seem to be *Eucrostis dominicaria* Gn. i, 367, from St. Domingo. Prof. Riley's specimens were from Key West, Fla.

Acidalia ordinata Wlk. 722, *A. puraria* Wlk. 796, and *A. candidaria* Pack. are the same.

Acidalia obfusaria Wlk. 786, is *A. punctofimbriata* Pack.

Under *Acidalia insularia* Gn. i, 469, may be placed the following: *A. invariata* Wlk. 1596, *A. asthenaria* Wlk. 737, *A. imparata* Wlk. 1598, and *A. persimilata* Grt.

Acidalia impauperata Wlk. 721 and *A. defixaria* Wlk. 796, are *A. frigidaria* Moesch. These and *A. consecutaria* Wlk. sup. 1623, with *A. sobria* Wlk. sup. 1624 are, I think, forms of *inductata* Gn. i, 494.

Lozogramma subæquaria Wlk. 1660, is *L. defluaria* Wlk. 984.

Acidalia similaria Wlk. 1592, of the D'Urban collection is, on the authority of Mr. Moffat, probably *A. quadrilineata* Pack. The type specimen is in poor condition, and is in the collection of the entomological society of Ontario.

Acidalia anticaria Wlk. 1593, of the same collection, and on the same authority, is probably the same as *A. subalbaria* Pack.

I also have received from Mr. Moffat a sketch of *Boarmia divisaria* Wlk. 489, of the D'Urban collection, and it is the same as *B. crepuscularia* var. *abraxaria* Wlk. 403. The name could not at any rate hold, as Walker had described *B. divisaria* previously, page 366, from Port Natal, Africa.

Of the other Boarmiæ of the D'Urban collection only two remain undetermined from the types, and the types are lost. Mr. Moffat writes me that in the drawer of the collection containing the Walker types of *Boarmia* is a paper, written probably by Mr. Reed, who was curator at the time of Mr. Grote's examination, as follows: "Grote says *Boarmia divisaria* is a good species; all the others, six in number, are synonyms." We have thus Mr. Grote's decision that none of the other species were valid. The two not determined are *B. convergaria* and *B. ejectaria*. *B. convergaria* may be *B. larvaria* Gn. and *B. ejectaria* may be *B. humaria* Gn. though only the wildest guess can be made from Walker's descriptions.

Ephyra ignotaria Wlk. 1576, and *E. triseriata* are synonyms of *E. myrtaria* Gn. i, 408.

Acidalia rufilineata Wlk. 783, is *A. timandrata* Wlk. 724.

Acidalia myrmidonata Gn. i, 487, is *Eois minutularia* Hulst, and *Craspedia lautaria* Hbn.

An insect from Key West, sent me by Prof. Riley, is *Acidalia umbilicata* Gn. i, 504, with *A. indoctaria* Wlk. as a synonym.

Acidalia restrictata Wlk. 722, *A. mensurata* Wlk. sup. 1621, and *A. continuaria* Wlk. sup. 1622, are the same as *A. ennucleata* Gn. i, 505. They are none the form ordinarily known as *A. ennucleata*, but the light colored insect without blackish spots and markings. The blackish insect Guenée figured as a variety of *ennucleata*, which I do not think it is. *A. reconditaria* Wlk., which I was not able to find in the Museum, is probably it, and it is probable that *Eulepidotis alabastaria* Hbn. may be the same thing. I see after my return that Mr. Grote has determined *A. reconditaria* as *A. ennucleata* from the type which he saw.

From Key West I have specimens sent from Prof. Riley which may be *Acidalia nataria* Wlk. sup. 1625; and also from southern Florida other specimens which are probably *Acidalia subquadrata* Gn. i, 459.

Ac'dalia ossularia Hbn. has the following as synonyms: *A. temnaria* Gn. i, 476, *A. sublataria* Gn. i, 474, *A. magniferaria* Wlk. 784, *A. flavillifera* Wlk. sup. 1624, and *A. repletaria* Wlk. sup. 1624. I fancy *A. violacearia* Wlk. may be the same insect.

Acidalia tacturata Wlk. 721 is the same as *A. eburneata* Gn. i, 474.

Almodes rivularia Grt. is the same as *A. terraria* Gn. i, 380. In "Novitates Zoologicæ," vol. i, p. 376, Mr. Warren gives a list of five other synonyms.

Conchylis cretiferana Wlk., said by Prof. Fernald to be a Geometer, is not a Geometer, but a Deltoid. The type has only the front wings left, and these are very much faded. It appears to be one of our common species.

Acidalia tremularia Wlk. 1614, is a *A. pannaria* Gn. i, 470.

Acidalia quadrannulata Wlk. 1595, is *Ephyra pendulinaria* Gn. i, 414.

Macaria impropriata Wlk. 888, is a synonym of *Paraphia subatomaria* Haw. as are also *Macaria fidoniaria* Wlk. sup. 1654, *M. exsuperata* Wlk. 1655, *Paraphia mammuraria* Gn. i, 273, *P. deplanaria* Gn. i, 272, and *P. nubecularia* Gn. i, 272.

Ennomos lutaria Wlk. sup. 1552, is *E. magnaria* Gn. i, 174.

Melanippe furcifascia Wlk. 1294, is a synonym of *Cidaria hastata*, var. *gothicata* Gn., as is also *hecate* Butler from Japan. It is the form with unicolorous black hind wings.

(To be continued.)

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HIGH MOUNTAIN MOTHS.

By DAVID BRUCE, Brockport, N. Y.

I had stayed at a ranch in Park County, Colorado, for a few days every time I visited the State. The house was pleasantly situated on the south side of a long picturesque cañon, which ended at about 13,000 feet elevation in a broad gulch, overlooked by some of the highest peaks of the front range. The dwelling itself was exactly 10,000 feet above sea-level; the sloping hill sides were well covered with pines, poplars, willows

and various shrubs. Several rapid creeks, fed by the melting snows, tossed and tumbled noisily over their rocky beds, their banks being bright with wild flowers and grasses; occasionally the cañon would expand into wide boggy meadows (called "Broads," by the ranchmen, as the contracted spaces, hardly wide enough for a wagon-road, were also locally termed "Narrows"); a few hundred head of cattle roamed around, but were not in sufficient numbers to destroy the herbage, as is too often the case in the western mountains. Butterflies were abundant everywhere, and whether I rambled lower down the valley or climbed above timber to the higher levels I seldom returned without being well pleased with my captures, if the weather was fine, as the mornings always were; a few day-flying moths would occasionally present themselves—*Platarctia hyperborea* one day clumsily tumbled round a low willow close to the house and was quickly transferred to my cyanide bottle, a few examples of *Arctia cervinata* Strecker and *Antarctia brucei* Hy. Edw. occurred among the rocks; in the open spaces in the forests a small *Hemaris* was not uncommon at the blue flowers of *Mertensia*, on which plant the gray larvæ of *Gnophæla vermiculata* was feeding, *Nemeophila plantaginis* and *Alypia lorquinii* were frequent, the latter to be always found where *Epilobium* grew. In August the larvæ were very abundant on this plant; very rarely, indeed, *Lepisesia flavofasciata* was seen at blossom of *Ribes;* this larvæ I also found in July on *Epilobium*. Above timber, at the very edge of the melting snow-banks, the flowers were alive with four or five species of *Plusia* and a few *Oncocnemis* and *Melicleptrias*, the last apparently sleeping in the blossoms by night, as I frequently found them in a half torpid state in the early mornings inside the petals. On the mountain sides and highest peaks a few species of *Anarta* and *Agrotiphila* were lively in the sunshine, and occasionally a Geometrid would start from the rocks or be dislodged from the bushes, but as a rule the Heterocera were sparingly represented, not more than two or three dozen species being found in three Summers. I tried sugaring without the slightest success. On two or three occasions I saw a moth buzzing round the lamps in the house, but it was always *subgothica* or *auxiliaris*. As the motto and practice of every person at the ranch was "early to bed and early to rise," and I was generally well tired out when I got home, and after supper I had my cap-

tures and correspondence to attend to, I tumbled into bed nightly quite satisfied that I had thoroughly ransacked and exhausted the lepidopterological store of the vicinity.

An accident, however, opened my eyes, and I came to a quite different conclusion. One fine day at the end of July I met with a serious mishap that kept me indoors for two weeks with a couple of fractured ribs and sundry painful cuts and bruises. For the first three days the pain entirely kept me from thinking about insects; but I noticed a few moths at my bed-room window attracted by the lamplight. When I was able to move about, my kind landlord furnished me with a couple of large lamps, one of which I set at the window and fixed the other on a box at the open front door, I sitting on a chair just inside the house with net, bottle and box in readiness. As soon as it was dusk, *Mamestra olivacea* and several other small species new to me, came in plenty; as it grew darker larger species came. At last, with a bump against the lamp, *Agrotis ingeniculata* introduced itself to science for the first time. This large and handsome species was quite common for a few nights. I give below a list of my captures in ten nights. I always quit at eleven o'clock, as by that time at this high elevation the air began to get very cold and sometimes quite frosty. Those marked with an asterisk were common. I give the Bombycids and Noctuidæ only.

Lithosia bicolor
*cephalica**
Euprepia caja var. *utahensis*
Arctia parthenice
*Parorgyia leucophea**
Ichthyura bifiria
Cerura albicoma
var. *cineroides**
Gluphisia sp. ?*
Datana perspicua
Halisdota maculata
*Oedemasia salicis**
Heterocampa grisea
Tolype velleda
Gastropacha wildei
Hypopta henrici
Hepialus McGlashani
Panthea gigantea
Raphia frater var. *coloradense**
Arsilonche albovenosa
Merolonche spinea
Acronycta three sp. (undetermined)
Rhynchagrotis rufipectus
*variata**
*Pachnobia littoralis**
*Agrotis ypsilon**
*ingeniculata**
*Peridroma saucia**
*Noctua baja**
*haruspica**
havilæ
*lubricans**
*Chorizagrotis auxiliaris**
*agrestis**
*Feltia subgothica**
venerabilis
*vancouverensis**
volubilis

Porosagrotis satiens
*rileyana**
*orthogonia**
*dædalus**
*Carneades recula**
*quadridentata**
*oblongastigma**
*ridingsiana**
*flavidens**
*flavicollis**
brocha
velleripennis
gagates
*messoria**
brumeigera
*munis**
*basiflava**
*tessellata**
albipennis
obeliscoides
*Mamestra juncimacula**
*crotchii**
liquida
rosea
invalida
*trifolii**
cristifera
noverca
*olivacea**
*rectilinea**
*fuscolutea**
Scotogramma inconcinna
Ulolonche fasciata
orbiculata
Xylophasia suffusca
morna
alticola
lignicolor
*semilunata**
Hadena leucoscelis
fractilinea
Hillia senescens
algens
*Pseudanarta flavidens**
*Perigea albolabes**
*Homohadena badistriga**
Oncocnemis dayi
Dryobota stigmata
Hydræcia juvenilis
cataphracta
serrata
*Leucania bicolorata**
pallens
patricia
phragmatidicola
*adonea**
Ufeus plicatus
*Caradrina miranda**
Amphipyra glabella
*Orthodes cynica**
*Himella contrahens**
Tæniocampa trifascia
carminata
Pyrrhia umbra
*Orthosia eurœa**
helva
Scoliopteryx libatrix
Litholomia napæa
Xylina georgii
*carbonaria**
Xylomiges dolosa
*perlubens**
Calocampa brucei
Cleophana antipoda
Ingura declinata
Deva purpurigera
Plusia æroides
putnami
biloba
*brassicæa**
angulidens
epigæa
snowi
Caloplusia hochenworthi
devergens
*Stibadium spumosum**
Plagiomimicus expallidus
Schinia albifascia
*Acontia angustipennis**
*candefacta**
aprica
elegantula
Homoptera sp.?
Eubolina mima

ABERRATION, VARIETY, RACE and FORM.

By Dr. RODRIGUES OTTOLENGUI.

(Continued from page 38, vol. vi, ENT. NEWS.)

Prof. Grote writes: "Variation in color or marking when occurring among typical examples is variety, and varieties should receive a Latin name. For example, *Agrotis wilsonii* occurs in a typical olive-gray variety, and in a red variety (*specialis*). It does not matter that intermediary examples exist. The terms must be employed to designate properly the variety. It is the property of varieties that they intergrade, of species that they do not pass into one another."

Mr. Dyar says: "The variety may intergrade with the normal form, or it may not. In the latter case it is either an aberration, dimorphic form, or local race. * * * * I would always name a dimorphic form or a local race." (I would interrupt myself here to query, under which of these heads Mr. Dyar places the occasional yellow form of *Arctia virgo*, to which he recently gave the name . . . . .)

He continues: "The practice of naming intergrading varieties can so easily be carried to an extreme that I do not like to advise it."

Mr. Neumoegen quotes from Neumoegen and Dyar's Revision of the Bombyces, and recognizes local races, "whether connected by intergrading in the intermediate territory or not."

Let us consider the meaning of intergrading.

I believe that all of us accept the theory of evolution. Then let us imagine as a starting point a "fixed form" as representing a species. It is hardly conceivable that even in the earliest stages Nature ever fashioned two individuals in an identical mould. Even the slightest diversity would have produced what I shall call Individuality. In time these "individualities" would necessarily grow more marked and definite, and the breeding of the more similar individuals with each other, would in time evolve from a fixed form, a variable one. This variableness in like manner would increase in the course of years, until at last the species would be represented by individuals of quite diversified appearance, instead of as originally by creatures superficially similar. When the species was fixed it would be easy to choose one or more specimens to serve as a type. But when the variable pe-

riod had arrived, only a long series of specimens could be truly typical of the species. The next step in this evolution would be the arrival of a form which began to occur in relatively large numbers, and when the time arrived when this new form was represented in reasonable proportion, to the greater number of individuals which still resembled the original type, we would have what I would consider a good variety. This variety would be connected with the ground type by intergrades, but the difference between it and the intergrading forms would be, that it would be more constant than any other selected individual, and reasonably constant as compared with the original type. Evolution might go further, or it might not. If it went on we would get other varieties, with intergrading forms between each. The species would be represented, let us say, by a ground form, the type, and suppose we stop at three varieties with intergrades between. Normally, the varieties would be more fixed and more numerous as they more closely resembled the type. But any variety would be less rare than the intergrades. On the other hand if evolution stopped with one variety, the next step would be the gradual disappearance of the intergrading forms, which of course would also occur in time regardless of the number of varieties thrown off. The first individual appearance of one of these extreme forms being at the moment the most distant from the type, but the forerunner of others similar to it, and thus the precursor of a variety, is what I understand by Aberration.

With this idea of the meaning of intergrades we find that Intergrades are of three classes.

First, the fixed species has become variable, and all the individuals differ essentially from all others. Possibly there may be a rare and extreme form, the "aberration."

Second, there may exist one or more distinct forms called varieties, with intergrading forms between the varieties, and between the type and the variety most similar to it. But given a thousand insects it should be possible to separate the varieties into groups; when it would be seen that in a given lot, under a given name, the individuals would resemble one another as much as the typical specimens would in similar numbers. The intergrades, however, would not do this.

Third, there may exist one or more varieties, each as fixed as the type, but with no intergrades, except where the varieties may

be considered as intergrades between the type and the variety which is farthest removed from the type.

Now, to continue this story of evolution, the time may arrive when the variety begins to breed true to itself. It increases in numbers to such an extent that the individuals mate among themselves, and in time produce others of their kind. It is possible that this occurs gradationally. At first the offspring of the variety would throw back to the type in the majority of cases, but by continued selection of mates of their own kind the variety would increase in numbers until at last it produced only of its own kind. This brings us a new race, and is commonly supposed to inhabit a locality different from the home of the type. That there should be intergrades in intermediate territory is but an argument in favor of the theory of evolution; for environment must play as great a part in the departure from the original type, as does the accentuation of individuality.

But it has been truly said that species breed true to themselves and varieties do not. Then why is this a local race, and not a new species, for we allow of course that Nature by evolution is aiming at new species?

The local race is distinguishable from a new species only by breeding. The imago being the perfect insect, evolutionary changes show there first, and by breeding true in a local race, we mean merely the reproduction of similar imagos, the eggs and larvæ would remain typical. When the eggs and larvæ also were different a new species would have been evolved. My idea of classification then would be thus:

Species.—Individuals markedly similar, though great variableness might exist. Breeding true in all periods of transformation.

Race.—Local variety, markedly different from the specific type, breeding true in the imaginal period.

Variety.—A departure from type of species, occurring in sufficient numbers to indicate a permanency of the form; not breeding true. Intergrades may or may not exist. When they do, the evolution of the variety is not yet complete. Their absence marks the permanency of the varietal form, and the disappearance of the connecting link.

Aberration is the extremest departure from specific type, with or without intergrades, or with or without intermediate varieties. In the first instance it announces a new variety, and in the second that the evolution of varieties is not yet complete.

Form is a word which might be made to apply to such occasional, but constant departures from type as are well recognized under the terms—dimorphic or seasonal forms, and sexual forms.

A monstrosity is not to be confounded with an aberration. The aberration is a normal creature, while the monstrosity is abnormal in some structural feature. It may be in the form of the body, in a commingling of sexual appearances (without necessarily being hermaphroditic), or any alteration which would produce a symmetry. I have seen two monstrosities worthy of mention. One a male, *Papilio turnus*, with one primary marked like *Glaucus*. Another was a *Cecropia*, on the primaries of which was a departure from symmetrical marking, the two, however, being unlike.

Hermaphrodites and hybrids need no description beyond mention.

On the question of the propriety of giving names I would advocate the naming of all well-defined species, varieties, races and perhaps aberrations and forms.

———o———

THOMAS SAY.—III.

By Prof. F. M. WEBSTER, Wooster, Ohio.

In the Winter of 1825–26 there descended the Ohio River from Pittsburg a craft somewhat resembling a western flat boat. The passengers on this primitive vessel were, many of them, noted in the scientific and literary world, among them being Thomas Say, who, with Messrs. Owen, Maclure and others, were making their way to the new home of the recently organized confraternity. This craft landed its passengers at Mt. Vernon, Ind., from whence they were conveyed overland to their destination. From that day to the present the cargo of that primitive craft has been known as "the Boat Load of Knowledge," and one of the persons composing it, Mr. Victor C. Duclos, is still living in New Harmony. A year or more later Say was married to Miss Lucy May Sistare, an accomplished and talented young lady, sister of Mrs. Frances Ball, wife of the well-known jeweler. Dr. Edward Murphy, now living in New Harmony, and an annual attendant at meetings of the American Association for the Advancement of Science, was a guest at the wedding of Mr. and Mrs. Say. The subject of this sketch is described as being fully six

THE HOUSE IN WHICH SAY DIED.

feet in height, slender, with a slight lisp to his articulation, which gave to his naturally gentle voice a musical softness.

Whether the newly-wedded pair at once took up their abode in the house shown in the February number of the NEWS, or in the one illustrated in the present number, I am unable to learn. As it was in the last-mentioned that Say's death took place, it seems quite probable that the other was their first home, and that he afterwards moved into the one here represented. The present illustration shows the house as it appeared in the Winter of 1888–89. A portion of the original structure was burned in 1843, and afterwards rebuilt somewhat differently in point of architecture from the original, but the lower portion fronting the street to the left, as in the engraving, long used as kitchen, dining-room, etc , is as originally built by George Rapp soon after the Rappite community was established in 1815, and afterwards occupied by Thomas Say. With the purchase of the lands and buildings of this community by Robert Owen, in 1824, it passed into the hands of Messrs. Owen and Maclure, and seems to have been transferred to Mr. and Mrs. Say, probably by either Alexander or William Maclure, and later sold by the Says to David Dale Owen. So, we only know that for a time at least it was owned by Say, that it was within its walls that he breathed his last, and that his ashes peacefully rest in a tomb located within the grounds to the rear of the house here shown.

Besides his connection with the Philadelphia Academy of Natural Sciences, he was a foreign member of both the Linnean and Zoological Societies of London. He was also a member of the Masonic Fraternity.

After the death of her husband, Mrs. Say remained for several years in New Harmony, but later moved to New York, and made her home with her sister. A few years before her death, which occurred several years ago, and at the age of eighty-three, she wrote an excellent letter to a friend in New Harmony.

(To be continued.)

CAPT. BEECHEY tells us he saw many asses, heavily laden with Locusts for food, driven into the town of Mesurata, in Tripoli.—"*Exped. to Africa*," p. 107.

ENTOMOLOGICAL NEWS.

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PHILADELPHIA, PA., MARCH, 1895.

PHOTOGRAPHS.

SEVERAL times we have made appeals for photographs for the albums of the American Entomological Society, and are pleased to say that many of our entomological friends kindly responded. Some of our subscribers were under the impression that we only wished those of people who have done much entomological work, either as collectors or writers, but such is not the case, as we would like a photo. of every one interested in entomology. These pictures are of great interest, especially those collected early in the history of the society. Some day some one may wish to publish a history of entomology in the United States, or a series of biographical sketches of entomologists, and such a collection of photos would be indispensible. There is also an inevitable law of Nature that all must obey, and we all know that it is very gratifying to be able to look on the facial lineaments of those friends and correspondents, perhaps never seen, but to whom we have become attached by a community of interests.

☞ The Publication Committee of the American Entomological Society have now in press a complete Supplement to Henshaw's List of Coleoptera of America north of Mexico, published in 1885, including all additions, corrections, etc., since that date; this will take the place of the first and second supplements published in 1887 and 1889 respectively, both of which are now out of print, and at the same time be complete to the end of 1894. Those desiring copies should apply to the Treasurer. The price will be 50 cents per copy. See advertisement on third page of cover.

DEPARTMENT OF ECONOMIC ENTOMOLOGY.

Edited by Prof. JOHN B. SMITH, Sc. D., New Brunswick, N. J.

The Chinch-Bug.—Bulletin No. 55, from the office of the State Entomologist of Illinois, Prof. S. A. Forbes, is an interesting little pamphlet. It contains a very brief record of the chinch-bug invasion of 1894, the prospects for 1895, a brief statement concerning contagious disease and other experiments, and a series of recommendations for 1895. There are only seven pages of print, but they contain a great deal of history and suggestive information. "The history of chinch-bug injury in Illinois is substantially that of a succession of waves of increase which rise to a highest point and then suddenly fall away to insignificance, the rise of the wave usually occupying from three to five years or more, and its recession requiring only one or two." Prof. Forbes thinks it probable that the culminating point of such a wave has been reached and would feel no surprise if the season of 1895 witnessed its recession. As an important factor in causing the decrease of the insects he recognizes the "white muscardine" disease, due to *Sporotrichum globuliferum*, but he is not enthusiastic as to the possibility of controlling chinch-bug injury by the artificial propagation of the disease. Among a series of conclusions the following are especially interesting:

"1. The white muscardine will not spread among vigorous chinch-bugs in the field in very dry weather to an extent to give this disease any practical value as a means of promptly arresting chinch-bug injury under such conditions. It may be added that chinch-bugs are usually vigorous in dry weather.

"9. The resistant power of healthy chinch-bugs exposed to infection is well shown by the fact that thousands of bugs, young and old, have commonly lived for many days, and even for several weeks, moulting, maturing, copulating and laying their eggs, when shut up in infection boxes which had been heavily stocked with fungus spores from dead insects and had been made in every way as favorable as possible to the development of the disease. The percentage of those that would succumb from day to day was often ridiculously small.

"From all our experimental work thus far completed, I draw the general conclusion that infection with the fungus of the white muscardine of the chinch-bug is an uncertain measure, largely dependent for its practical value upon conditions beyond the influence of the experimenter, and whose occurrence or prevalence it is impossible for him to foresee. It appears, on the other hand, to be so powerful an agency for the destruction of chinch-bugs *en masse* when the weather favors its development and spread, and can be made by proper organization so inexpensive to the individual and to the State, that it is well worthy of the most thoroughgoing scientific study and practical field experimentation."

This expresses the opinion of the conservative students and those who have most carefully studied the nature of fungus diseases in insects, animals or plants. The diseases may be fatally effective under certain circumstances—but we cannot produce the circumstances to order, and while we are waiting for the necessary meteorological conditions the chinch-bugs may destroy the crop. It is well to have the disease in hand, ready for use in favorable seasons, but we must also be prepared with other means as effective alternatives, some of which Prof. Forbes points out. It is a fact, of course, that some insect diseases seem to be to a large extent independent of heat or cold, wet or dry, and seem to be able to spread rapidly in all weathers. Of this type is the disease which attacks the larva of the clover-leaf beetle—*Phytonomus punctatus.* I have watched it for five years in succession, and each year, no matter what the character of the season, the fungus has attacked the half grown larvæ and has swept them away just when they threatened injury to the crop. The factors that facilitate the remarkable spread of this disease are not yet well understood; but they are evidently quite different from those controlling the "white muscardine" of the chinch-bug.

Cabbage Root Maggot, Etc.—On this subject Mr. M. V. Slingerland gives us, in Bulletin 78, of the Cornell Experiment Station, nearly one hundred pages of information. While the cabbage maggots are more especially treated, there are incidental notes on other species and much information is contained on the subject of maggots in general. The Bulletin is really an exhaustive treatise which can only be commended, and the subject of remedies is very fully treated. Practically, the recommendations narrow down to tarred paper cards, put on when the plants are set out to prevent oviposition on the surface at the base of the stem, and to the use of bisulphide of carbon to destroy the insects when they have attacked the plants. For the application of the bisulphide an injector is described which seems practical. I have elsewhere expressed the conviction that bisulphide of carbon would come into much more general use when its range was fully understood, and when its cost was reduced to a point justifying its use in the field. The question of cost has been recently made satisfactory, and now it is in order to ascertain what can be done with the material. Mr. Slingerland has proved its usefulness in one direction; my experiments tend to show that it may be used against plant-lice in the field, under certain circumstances; in the green-house its usefulness can scarcely be over-estimated, while in forcing beds, which can be covered, it may be used as against all, except scale insects. Its use in destroying insects infesting stored grain and seeds is well established.

Oviposition in Cicada hieroglyphica Say.—During the latter part of June, 1894, a small party of entomologists spent three or four days collecting at Anglesea, N. J., where many rarities have been found in times past, and more yet remain to be found in times to come. Among the party were Dr. Skinner and Mr. Hoyer, who were greatly exercised over a more or less persistent "singing," which they claimed must be due to a *Cicada.*

They finally resolved to run down these "singing machines" as they were christened, and by care and patience located them on some old and battered cedar trees, capturing several males of *Cicada hieroglyphica* Say. Later in the day the axe and chisel were brought into use on these same trees, and a number of coleopterous larvæ and pupæ were secured, the trunks presenting a badly wrecked appearance when they were finally abandoned. Next morning I heard a specimen of the *Cicada* "singing," and by careful moving located him. But not him alone; his mate was close by on the bare trunk, busily engaged in ovipositing. I watched the specimen for some time and made sure of what she was doing before capturing her. In the character of the egg punctures there was nothing distinctive, but the selection of the raw surface of the wood where we had been chopping was interesting. The trunk was dead and was soft rotting, and into this soft wood the eggs were laid.

The Codling Moth.—"Insect Life," vol. vii, No. 3, p. 248, contains an instalment of proof, by Mr. Marlatt, that the Codling Moth is double-brooded in many places. This is in response to my suggestion that perhaps it had been too generally assumed that there were two broods, and that we might find the second brood exceptional in some localities. Mr. Marlatt is undoubtedly correct in all his observations, and we may assume two broods as the rule throughout the central and southern United States, and even in southern New Jersey, but where the insect becomes single brooded is yet a question. My own observations were positive, and are not doubted by Mr. Marlatt, but it does seem as if New Brunswick was very abnormally situated and not favorably for the development of insect life. Incidentally, it may be said that it is a miserably poor collecting region for most orders of insects.

A New Chilean Vine-destroying Insect.—About the year 1880 my attention was called to a small vineyard at Quillota half destroyed by some unknown disease. On examining the roots of some of the dead and dying vines I found a curious gall-like body on all of them. These galls or cysts, were sub-spherical in shape, the shell was rough, of stout texture, reddish brown in color, from 5 to 7 millimetres in diameter and full of a liquid of a creamy color and consistency, with a very peculiar and abominable odor. An examination of this fluid under the microscope showed corpuscles floating in it, also what I took to be rudiments of tracheæ. One of the best microscopists that I ever met, my friend Dr. Bruner, also studied these bodies very attentively, but failed to arrive at any definite conclusion. I fancied we were examining the larva of an insect in the act of changing into the pupa state, yet the change was so complete that no rudiment of any organ could be found, except the supposed tracheæ. Various remedies were tried on the vineyard, but in vain, and the vines were uprooted and replaced by lucerne (*Medicago sativa*). I paid no more attention to the matter for some years, but in Nos, some one hundred miles to the south of Quillota, serious damage

was reported as being done in vineyards by the same insect. In 1884 an article appeared on the subject, written by Mr. F. Philippi, who stated that the cysts were produced by mematod worms, and he then described the species as *Heterodera vitis*, giving a drawing of a European species of worm. It would appear that Mr. Philippi does not need to see a species in order to describe it, as he had only the galls or cysts, to build upon, the worms were evolved from his inner consciousness.

About November, 1893, my sons were collecting insects near the Canquenes Baths, and, to my surprise, brought me a lot of the cysts, though there is no vineyard for many miles. I then determined to investigate the matter seriously, and found that some fossorial wasps, of the genera *Trachypus* and *Sphex*, were carrying the cysts to their nests. I next got my boys to find out where the wasps got them from, and so found large numbers in a dry, sandy spot, destitute of vegetation. These were carefully kept in the hopes of breeding the perfect form, but I got no results.

In October and November, 1894, I again collected a lot of cysts, and kept on getting them at intervals of a few days.

Early in December two females emerged, and I got several more where I found the cysts, but as yet I know nothing of the male. The galls or cysts, live on a great variety of Chilean plants, especially on annuals, which explains their presence in places where, during the Summer drought vegetation disappears.

The insect bred from the cysts appears to belong to the genus *Margarodes* Guilding, allied to *Porphyrophora* Brandt, and as Philippi described a worm that never existed I see no reason why we should apply his specific name to an insect whose existence he never suspected:

Margarodes trilobitum spec. nov. ♀.—Body elliptic, of a dull whitish yellow color, thinly covered with soft hairs, most abundant on the dorsal region. On the underside there are short, stiff hairs, that assist in locomotion. There is no distinct head, but at the anterior extremity of the body, beneath, are antennæ, seemingly 8-jointed; the basal joint, however, is pale, soft, and appears to represent the antenniferous tubercle; the other seven joints are of a clear brown color, with verticillate hairs, moniliform and tapering from base to apex. No eyes or ocelli are visible, even under the microscope with an inch lens, nor can any trophi be seen, though there is a depression, near and behind the anterior legs, that probably represents the mouth cavity. The anterior legs are well developed, though small, and armed with strong fossorial claws, probably of use to the insect in escaping from the pupal cyst, and in locomotion, as anchors. The posterior pairs of legs are slender and short, almost rudimental; the tarsi are 3-jointed, the two basal joints anchylosed, the apical freely articulated; each tarsus has one claw, very large relatively to the size of the leg.—Edwyn C. Reed.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

[The Conductors of ENTOMOLOGICAL NEWS solicit, and will thankfully receive items of news, likely to interest its readers, from any source. The author's name will be given in each case for the information of cataloguers and bibliographers.]

To Contributors.—All contributions will be considered and passed upon at our earliest convenience, and as far as may be, will be published according to date of reception. ENTOMOLOGICAL NEWS has reached a circulation, both in numbers and circumference, as to make it necessary to put "copy" into the hands of the printer, for each number, three weeks before date of issue. This should be remembered in sending special or important matter for certain issue. Twenty-five "extras" without change in form will be given free when they are wanted, and this should be so stated on the MS. along with the number desired. The receipt of all papers will be acknowledged.—ED.

IN an English paper, the *Observer*, of July 25, 1813, there is an account of a "swarm of Bees resting themselves on the inside of a lady's parasol." They were hived without any serious injury to the lady.

ON the cover of ENT. NEWS for January, 1895, I notice the figure of a moth named *Composia olympia*. Would it not be better to give the species its older name, *C. fidellissima* H. S.? I have already called Mr. Butler's attention to the fact that he had redescribed Herrich-Schäffer's species, and the types of *C. olympia* are now placed in the British Museum collection as *C. fidellissima* H.-S.—W. SCHAUS.

THE FIRST NUMBER of the new volume (xxii) of the "Transactions" of the American Entomological Society, now in press, will contain the following papers: On the Oribatoidea of the United States, by Nathan Banks; A Monograph of the tribe Bassini, by G. C. Davis; Descriptions of a few new Pimplinæ, by G. C. Davis; Contributions to the Dipterology of North America, by C. H. Tyler Townsend.

THE wild Locusts upon which St. John fed have given rise to great discussion—some authors asserting them to be the fruit of the carob tree, while others maintain they were the true Locusts, and refer to the practice of the Arabs in Syria at the present day. "They who deny insects to have been the food of this holy man," says Hasselquist, "urge that this insect is an unaccustomary and unnatural food; but they would soon be convinced of the contrary, if they would travel hither to Egypt, Arabia, or Syria, and take a meal with the Arabs. Roasted Locusts are at this time eaten by the Arabs, at the proper season, when they can procure them; so that in all probability this dish has been used in the time of St. John. Ancient customs are not here subject to many changes, and the victuals of St. John are not believed unnatural here; and I was assured by a judicious Greek priest that their church had never taken the word in any other sense, and he even laughed at the idea of its being a bird or a plant."—*Cowan's Curious Facts.*

THE entire library of Mr. C. H. T. Townsend, was destroyed by fire in Las Cruces, New Mex., while he was East in January. He will be grateful to correspondents and others who will send him sets of their papers to enable him to replace those destroyed. He has removed to Brownsville, Texas, as Temporary Field Agent of the Division of Entomology U. S. Department of Agriculture.

IN 1811, at Smyrna, at right angles to a flight of Locusts, a man rode forty miles before he got rid of the moving column. This immense flight continued for three days and nights, apparently without intermission. It was computed that the lowest number of Locusts in this swarm must have exceeded 168,608,563,000,000! Captain Beaufort determined that the Locusts of this flight, which he himself saw, if framed into a heap, would have exceeded in magnitude more than a thousand and thirty times the largest pyramid of Egypt; or, if put on the ground close together, in a band of a mile and an eighth in width, would have encircled the globe! This immense swarm caused such a famine in the district of Marwar, that the natives fled for subsistence in a living torrent into Guzerat and Bombay; and out of every hundred of these Marwarees, Captain Carnac estimates, ninety-nine died that year! Near the town of Baroda, these poor people perished at the rate of five hundred a day; and at Ahmedabad, a large city of 200,000 inhabitants, 100,000 died from this awful visitation!—"*Penny Magazine*," 1843, p. 231.

THE Arabs believe the Locusts have a government among themselves similar to that of the bees and ants; and when "Sultan Jeraad," king of the Locusts, rises, the whole mass follow him, and not a solitary straggler is left behind to witness the devastation. Mr. Jackson, himself, evidently believed this from the manner he has narrated it (Morocco, p. 103). An Arab once asserted to this gentleman that he himself had seen the great "Sultan Jeraad," and described his lordship as being larger and more beautifully colored than the ordinary Locust (ibid. p. 106). Capt. Riley also mentions that each flight of Locusts is said to have a king which directs its movements with great regularity (Narrative, p. 235). The Chinese believe the same, and affirm that this leader is the largest individual of the whole swarm. Benjamin Bullifant, in his observations on the Natural History of New England, says: "The Locusts have a kind of regimental discipline, and, as it were, commanders, which show greater and more splendid wings than the common ones, and arise first when pursued by fowls, or the feet of a traveler, as I have often seriously remarked." The truth, however, is found in the Bible: They have no king (Prov. xxx, 27).—*Cowan's Curious Facts.*

Identification of Insects (Imagos) for Subscribers.

Specimens will be named under the following conditions: 1st, The number of species to be **limited to twenty-five** for each sending; 2d, The sender to pay all expenses of transportation and the insects to become the property of the American Entomological Society; 3d, Each specimen must have a number attached so that the identification may be announced accordingly. Exotic species named only by special arrangement with the Editor, who should be consulted before specimens are sent. Send a 2 cent stamp with all insects for return of names. Before sending insects for identification, read page 41, Vol. III. Address all packages to ENTOMOLOGICAL NEWS, Academy Natural Sciences, Logan Square, Philadelphia, Pa.

Entomological Literature.

1. THE AMERICAN NATURALIST. Philadelphia, January, 1895.—The use of parasitic and predaceous insects, C. M. Weed.

2. NATURE. London, Jan. 10, 1895.—The bird-winged butterflies of the East, W. F. Kirby, figs.

3. THE ANNALS AND MAGAZINE OF NATURAL HISTORY. London, January, 1895.—Descriptions of some new species of Heterocera from the Eastern Islands and Tropical America, H. Druce.—February, 1895. On the luminosity of midges (Chironomidæ), P. Schmidt (transl. from Zool. Jahrb.). On some insects collected in the State of Chihuahua, Mexico, T. D. A. Cockerell.

4. COMPTE RENDU. L'ACADEMIE DES SCIENCES. Paris, Dec. 31, 1894. —On the nests of *Vespa crabro* L.—order of appearance of the first alveoli, C. Janet.

5. PROCEEDINGS OF THE U. S. NATIONAL MUSEUM, xviii, No. 1041. Washington, Jan. 16, 1895.—Two new species of beetles of the Tenebrionid genus *Echocerus*, F. H. Chittenden.

6. ENTOMOLOGISK TIDSKRIFT, xv, 1–4. Stockholm, 1894.—On the structure and habits of *Hemimerus talpoides* Walk., Dr. H. J. Hansen, 2 pls. Lipuridæ from Florida, H. Schött. Contribution to the knowledge of the Aradidæ, E. Bergroth. Revision of the genus *Corisa* Latr. with respect to the Scandinavian species, H. D. J. Wallengren. Variability of *Argynnis aphirape* Hübn. var. *ossianus* Herbst, J. Meves, figs. [Economic entomology], S. Lampa, 1 pl., figs. Practical entomology in Ryssland, C. Grill. *Isaria densa* (Link.) Fries, parasitic on *Melolontha vulgaris* L., id. Parasiticida, S. Lampa. Revision of the Pseudoneuroptera of Scandinavia, H. D. J. Wallengren.

7. BULLETIN FROM THE LABORATORIES OF NATURAL HISTORY OF THE STATE UNIVERSITY OF IOWA iv, 1.—Supplement to the "List of the Coleoptera of Iowa City and vicinity," H. F. Wickham.

8. ENTOMOLOGISCHE NACHRICHTEN, xx, 24. Berlin, December, 1894. —Karl Lindeman's "Ueber den Bau des Skelettes der Coleopteren; über den Bau des Thorax derselben," a forgotten work, C. Verhoeff.

9. MITTHEILUNGEN DER SCHWEIZERISCHEN ENTOMOLOGISCHEN GESELLSCHAFT, ix, 4. Schaffhausen, October, 1894.—On the classification of the Cetonidæ, Dr. G. Schoch. Coleoptera Helvetica (cont.), Dr. G. Stierlin.

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17. Species des Hymenopteres d'Europe et d'Algerie. Fondé par Edmond André et continué sous la direction scientifique de Ernest André; 49e fasc. Paris, M. Dubosclard, Jan. 1, 1895.—Contains pp. 401-480, pls. xii-xiv, of vol. v, Braconidæ.

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19. Journal of the New York Entomological Society, ii, 4, December, 1894.—Notes on Phalangidæ, N. Banks. Note on the development of *Deltocephalus inimicus* Say, F. M. Webster. Preliminary revision of the Bombyces of America north of Mexico, B. Neumoegen and H. G. Dyar. Preliminary hand-book of the Coleoptera of northeastern America, C. W. Leng and W. Beutenmüller, 1 pl. On the use of bisulphide, A. P. Morse. An exodus of water beetles, W. T. Davis. Note on *Xiphidium nemorale*, W. Beutenmüller.

20. KNOWLEDGE. London, Feb. 1, 1895.—The Hessian fly, E. A. Butler, figs.

21. BULLETIN 78. Cornell University Agricultural Experiment Station, Entom. Div.—The cabbage-root maggot, with notes on the onion maggot and allied insects, M. V. Slingerland, pp. 481–577, 18 figs.

22. INSEKTEN-BORSE. Leipsic, Nov. 15, 1894.—On the bases of variation and aberration of the imago among Lepidoptera (cont.), Dr. M. Standfuss.

23. THE ENTOMOLOGIST. London, February, 1895.—Dr. F. B. White (with portrait). The sense organs of insects: a speculation, J. Watson. Jumping beans and jumping eggs, C. C. Hopley. The cold Autumn of 1894, and its effects on certain species of the genus *Vanessa*, J. Arkle. Wood naphtha as a relaxing medium, R. South.

24. ANNUAL REPORT OF THE NEW MEXICO COLLEGE OF AGRICULTURE AND MECHANIC ARTS, 1894. Las Cruces, N. M.—Entomology, T. D. A. Cockerell.—Bulletin No. 15, January, 1895. Entomological observations in 1894, Life zones in New Mexico, Entomological diary at Santa Fé. T. D. A. Cockerell.

25. PSYCHE. Cambridge, Mass., February, 1895.—Rehabilitation of *Podisma* Latreille, S. H. Scudder. Two new species of *Entomobrya*, F. L. Harvey, figs. The Tipulid genera *Bittacomorpha* and *Pedicia*, J. M. Aldrich, fig. Gall of *Eurytoma* sp. on the cat's-clawthorn, C. H. Tyler Townsend.

26. ANNALES DE LA SOCIETE ENTOMOLOGIQUE DE BELGIQUE, xxxviii, 13. Brussels, 1894.—Retiring President's address—the Ichneumonidæ, M. Tosquinet.—xxxix, 1, Jan. 31, 1895. New ants from various localities, especially from Australia, A. Forel.

27. TRANSACTIONS OF THE AMERICAN ENTOMOLOGICAL SOCIETY, xxi, 3. Philadelphia, June-September, 1894.—New species of Noctuidæ from tropical America, W. Schaus. A catalogue of the described Jassoidea of North America, E. P. Van Duzee. Descriptions of new parasitic Hymenoptera, W. H. Ashmead.

28. THE CANADIAN ENTOMOLOGIST. London, Ont., February, 1895.—The Coleoptera of Canada—vii. The Cucujidæ of Ontario and Quebec, H. F. Wickham, figs. Summary of the U. S. Phasmidæ, S. H. Scudder. *Alypia mariposa* larva, H. G. Dyar. *Actias luna*, H. H. Lyman. Canadian Coccidæ, T. D. A. Cockerell. Protective mimicry in spiders, F. M. Webster. *Preptos*, *Tamphana* and *Arotros*—a review, H. G. Dyar. On the Coleoptera of New Mexico and Arizona, including biologic and other notes, C. H. T. Townsend. *Acridium americanum*, J. A. Moffat.

29. THE ENTOMOLOGIST'S MONTHLY MAGAZINE. London, February, 1895.—Pre-occupied names and genera in the micro-lepidoptera, Rt. Hon. Lord Walsingham. Relaxing and setting insects, W. Farren.

30. INSECT LIFE, vii, 3. Washington. Issued December, 1894. Received Feb. 11, 1895.—Damage by the American locust, L. O. Howard, figs. Chinch-bug observations in Iowa in 1894, H. Osborn. The hibernation of the chinch-bug, C. L. Marlatt. The maple Pseudococcus (*P. aceris* Geoff.), L. O. Howard, figs. Notes on cotton insects found in Mississippi (cont.), W. H. Ashmead. The codling moth double-brooded, C. L. Marlatt. A new saw-fly which is injurious to hollyhocks, T. D. A. Cockerell. Note on *Hylesinus sericeus*, E. A. Schwarz, fig. A new parasite of *Mytilaspis pomorum*, L. O. Howard. The patent on the hydrocyanic acid gas process declared invalid, D. W. Coquillett. A new pear insect, fig. Scorpions, centipedes and tarantulas. General notes.

31. CONTRIBUTIONS TO SCIENCE by Charles J. Maynard, vol. ii, 1. Newtonville, Mass., July, 1893.—Notes on a singular specimen of the Polyphemus moth, *Attacus polyphemus*, pp. 36-38, figs.—No. 4, December, 1894. Defensive glands in a Bahama species of Phasma (pp. 191-193).

INDEX TO THE PRECEDING LITERATURE.

The number after each author's name in this index refers to the journal, as numbered in the preceding literature, in which that author's paper was published; * denotes that the paper in question contains descriptions of new North American forms.

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Doings of Societies.

PHILADELPHIA, Feb. 12, 1895.

A stated meeting of the Feldman Collecting Social was held at the residence of Dr. Henry Skinner, 716 N. Twentieth Street. Members present: Messrs. Bland, Fox, Johnson, Dr. Griffith, Hoyer, Boerner, Trescher, E. Wenzel, Dr. Castle, Haimbach, Seeber, H. W. Wenzel, Laurent and Schmitz. Honorary members: Drs. Geo. H. Horn, John B. Smith and Henry Skinner. Meeting called to order at 8.30 P.M., President Bland presiding. Dr. Horn mentioned that the cocoons exhibited at the last meeting by Mr. Seeber as being found in palm wood are probably formed by a species of *Sphenophorus*, as some of the species are known to transform in such places and make cocoons as described. He then exhibited a fine and complete series of *Pleocoma* and *Plusiotis*, giving the life-history of *Pleocoma*, stating that nearly all the species came from California, south of San Francisco. *Plusiotis woodii*, of which he exhibited a fine pair, were captured along the Rio Grande, Texas, by Dr. Wood, of the University of Pennsylvania.

Prof. Smith stated that he had discovered an entirely new sexual character in a species of Noctuidæ, *Remigia latipes*, which consisted of a tuft of hair, resembling a brush, situated on the prothorax, which does not exist in any of the other species; he further stated that there would never be a true classification of Lepidoptera until a collection large enough should be formed, from which specimens could be taken and denuded of their scales to allow of a thorough examination, instead of depending entirely on their superficial characters, as is mostly the case at present.

Mr. Bland gave an interesting and graphic account of a trip he had made during last July along the banks of the Poho Poko Creek, which empties into the Lehigh River at Parryville, Pa., finding a few specimens of Carabidæ, several of *Berosus*, *Dineutes*, *Haliplus*, *Dryops* and a number of *Elmis*.

Mr. Fox exhibited a bee, *Eulema dimidiata*, which he had recently received from Mexico, calling attention to the remarkable development of its tongue, which equaled the length of the body; he also exhibited a drawing of the tongue, showing the peculiar brush-like tip, which is present in the typical bees.

Mr. Johnson exhibited specimens of Diptera and Hymenoptera, calling attention to the mimicry of these species; this brought forth a general discussion on the powers of mimicry in the insect world; various cases being cited where it had been observed. Dr. Horn, however, questioned the correctness of the use of the term, stating that in his opinion it was nothing more than a resemblance, which is very likely the true definition, as it seems very improbable that any insect is itself responsible for the imitative qualities it may possess, as it is no doubt simply thus endowed by nature for its self-protection, in the absence of the sense of reasoning.

There being no further business the meeting adjourned to partake of an excellent banquet provided by Dr. Skinner.

This meeting will no doubt prove a memorable one to its members, notably every member being present, and the spirit of the meeting being of a characteristically scientific nature, the discussions continuing even after the members had done ample justice to the viands set before them. Dr. Horn occupied the chair of honor, Dr. Skinner acting as toast-master and calling on Drs. Horn and Smith, and Messrs. Bland and H. W. Wenzel; the responses bringing forth many interesting historical facts pertaining to entomology probably never recorded.

THEO. H. SCHMITZ, *Secretary*.

The Entomological Section

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

PROCEEDINGS OF MEETINGS.

JANUARY 24, 1895.

A regular stated meeting of the Entomological Section of the Academy of Natural Sciences was held in the Hall, S. W. cor. Nineteenth and Race Streets, this evening, Dr. Geo. H. Horn, director, presiding. Members present: Horn, E. T. Cresson, Skinner, Welles, Seiss, Calvert, Laurent, Johnson, Fox, Ridings. Associates: Dr. Castle and Mr. Reinick. Mr. Fox exhibited specimens of *Elis tricincta* and *Pompilus juxta*, taken at Lake Worth, Florida, by Mrs. A. T. Slosson. These have not been found in the United States prior to this time, being West Indian species. Mr.

Johnson spoke of his studies of some Diptera as follows: The results of my recent study of the genus *Stratiomyia* may be summarized as follows: the number of species in Osten Sacken's catalogue recorded north of Mexico is twenty-nine; to this number Bigot has since added six, a total of thirty-five. Of these fourteen have been reduced to synonymy, six remain unidentified, one has been referred to a new genus, and two new species have been described. This leaves for our consideration sixteen species; these are divided into three groups, the first Stratiomyia, *s. str.*, contains five species; the second, Thereodonta, two; and the third, Normula, nine. The color pattern is still largely used in distinguishing species, but in almost every case the male and female have both been studied.

Dr. Horn stated that his paper on *Scymnus* was nearly completed, and that he hoped to present it at the next meeting. Mr. Calvert quoted from Dr. Riley's presidential address to the Ent. Society of Washington of February, 1894, that no species of Odonata habitually hibernated, and stated that *Sympycna fusca* has been found to regularly pass the Winter in the imago state, in numbers, in France.

Dr. HENRY SKINNER, *Recorder.*

The following papers were read and accepted by the Committee for publication in ENTOMOLOGICAL NEWS:

Preparatory stages of Phlegethontius cingulata.

By HARRISON G. DYAR.

I find that the life-history of this Sphinx has not been written. The larvæ occurred commonly on morning-glory vines near Honolulu, Hawaiian Islands.

Egg.—Elliptical, nearly spherical, not flattened; smooth, shining, nearly colorless and translucent, with a greenish tinge; size 1.3 x 1.1 x 1.1 mm. Under a half inch objective the surface is smooth, shining, covered with circular shallow pits of varying size and irregularly distributed. Found on a leaf of *Ipomœa tuberculata* Roem. and Sch.

First stage.—On hatching, entirely white, with a black horn. Head rounded, not shining, pale greenish yellow, mouth a little darker, ocelli brown; width .55 mm. Body cylindrical, smooth, shining, distinctly annulated, uniform whitish, the food giving a dark green shade by transparency. A faint, narrow, white subdorsal line ending at the horn. Horn straight, thick, blunt at the end, black and minutely setose, its length 1.5 mm.

Second stage.—Head rounded, pale green, with many white setiferous granulations; ocelli black; width 1 mm. Body granular, the granules setiferous, white; color pale green; caudal horn black spinose, tapering, 2.5 mm. long.

Third stage (dimorphic).—Head rounded, green, with conical white granulations; a faint yellowish line runs up before the ocelli, in the brown form followed by a black shade posteriorly; width 1.8 mm. Body cylindrical, annulated, covered with white granulations; a very faint subdorsal line and indications of the seven oblique lateral lines, in the brown form preceded by black shades; spiracles surrounded by black and similarly colored marks on all the feet; spiracles ocherous.

Fourth stage.—Head uniform light green, thickly covered with small, round, white tubercles; a vertical whitish line before the black ocelli, width 3.2 mm. Body roughened with many white granulations like those on the head, more elongated on the caudal horn and bearing there minute setæ; color green, with a whitish shading and seven oblique lateral lines on joints 5–11, the last produced over joint 12 to the base of the horn, the others reaching from before the spiracle to subdorsal region, but continued back on the succeeding segment by a faint white shade. Lines pale yellow, preceded by a bright green shade and marked centrally by a small dash of light purple. Horn green, yellow at tip; thoracic feet red-brown; spiracles rusty brown, bordered narrowly with ocher.

Fifth stage (green form).—Head higher than wide, rounded, flat in front, smooth, shagreened; leaf green, with a broad, black, vertical band on each side covering the ocelli, which it just encloses by its well-defined anterior border; before it the ground color assumes a yellowish tint and preceding this yellowish shade is a faint, blackish clouded band; width 6 mm. Body plump and robust, the segments annulated; head slightly retracted below joint 2, and joint 2 below joint 3; but body elsewhere of uniform size. Horn large, tapering, curved backward, covered with short tubercles which bear very minute setæ. Body smooth, colored leaf green, a little mottled with whitish, with the following purplish brown mottled marks: a patch covering the thoracic feet and their bases; an oblique, subventral patch on joint 6 analogous to the marks covering the abdominal feet, each of which extends upward and forward obliquely in a broad band, ending at the anterior border of the segment; the one covering the anal foot extends along subventrally to the anterior edge of joint 11; subanal plate green, contrasting with the nearly black bases of the feet, bordered above by a faint brown subdorsal shade; a broad, subdorsal band, enlarged centrally on each segment, begins behind the cervical shield, widens and sends out an arm obliquely forward and downward on joints 5–11, each of which ends at the anterior edge of the segment before the spiracle. The band narrows on joint 11 posteriorly and ends at the horn, which is colored blackish brown with small greenish tip. The lateral branches of the subdorsal band are edged posteriorly with white, representing the usual oblique stripes; spiracles black, with a linear ocherous border and central dividing line, those on joints 5–12 surrounded by a circular black patch, contiguous (except on joint 12) to the oblique lateral lines. Length about 115 mm.; of horn 7 mm.

(Brown form) Head flesh-brown; a vertical black stripe over ocelli and

another near clypeus; sutures and jaws black. Body flesh-brown, densely covered with small, rounded, purplish black, confluent spots, almost covering the surface. Feet, cervical shield and venter entirely purplish black; on joints 3 and 4 a broad dorsal and narrow subdorsal bright brown band. Lateral oblique lines indicated by heavier mottlings above and predominence of the ground color below; spiracles black, with orange-red and central line, surrounded by black.

Pupa.—Tongue case large, distant from the body, extending to near the middle of the cases then recurved along the body to near its origin, rounded and a little enlarged at the end; cremaster broad, flat, narrowing laterally and ending in four short spines; color bright mahogany-red, darker on tongue case, cremaster nearly black. Length 64 mm.; width of thorax 15 mm.; length of tongue case about 47 mm.; distance from origin to joint of recurvature 21 mm.; diameter of tongue case 2.5 mm.

THE COMPOUND EYE.

By E. Brendel.

The anatomical and physiological comparison of the organ of vision is certainly a most difficult undertaking. Though the study of the eye of the vertebrate animals has progressed during the last century in an admirable way, notwithstanding there are left many obscure points which will perhaps never be elucidated. We do not know anything concerning the reversion of the image, nor the physiology of the cones, or bacillæ. The art of photography has helped us considerably in proving the law of vision. The momentary retension of an image by the exposure to the eye of a living vertebrate animal for the reception of the projection of an object on the retina has been proved in a chemical way by developing and fixing the image on the retina, demonstrating a physiological analogy of the photographic camera and the eye.

The image in the camera appears to us not convex, but as a geometrical projection, if the object is in all its parts equally illuminated, that is, shadeless. The presence of light and shade with its delicate gradation alone produce the imagination of rotundity in a rather defective way.

In the human eye the image is also plain when we use only one eye, but there are other additional factors than the shades of the object producing the perception of rotundity. There is our experience by touch assisting our eye—then the very defect of our vision, seeing sharply only such parts of the object which lie nearest to the optical axis is partly corrected by the combined use of our two eyes as each one receives an image from a different standpoint. The axes of vision of our eyes are convergent and adjustable. One eye sees parts of the object which the other cannot see; but the congruity of the images makes us in reality see more than the geometrical projection of the object on the single retina and corrects the flatness of the image. The photographer imitates nature by

combining two such images into one, the stereoscopic pictures which bring out the convexity of object provided we use each eye for the pictures on its own side only.

The mobility of the eyeball and the changes of the form of the lens by the ciliary muscles are other factors assisting the perception of rotundity.

Now, in the eyes of the insects all these accommodations to vision are wanting. The eyes are immobile, either single isolated eyelets (ocelli) or arranged in semi-globular clusters (compound eyes). The axes of vision of the eyelets in one cluster are divergent, nearing parallelism only with its next neighbor—eyelet. The form of the eyelet is not a globe, but a cylindrical cone, or, a better idea would be furnished by expunging from the globular eye a conical piece of the diameter of the cornea through the centre to the retina. The sensitive retinal portion is for that reason not so extensive as the corneal portion. The length of the cone is reversely proportional to the convexity of the cornea; the more convex the cornea the shorter the focus, the shorter the cone, the more divergent the axes of vision of two neighbor-eyelets, the more convex the cluster of the eyelet and the smaller the number of eyelets in one cluster. The reverse holds good in the same manner; the less convex the cornea the more numerous the eyelets and the less divergent are the axes of vision.

The isolated ocelli seem to be more resembling the form of the vertebrate eye. In the spiders they are arranged by fours in two transverse curves on the front and on the vertex of the head, which is much more movable than in the hexapodal insects and the visual axes by twos are supposed to be almost parallel, consequently have a greater range of vision.

As we do not know the physiological action of the parts of the retina in our own eye, much less we should speculate on the anatomy of the insect eye. We do not know even the situation of the sensitive parts, but we certainly know that the vision is very good, and the optical law are as applicant as with our own eye, and that the sensitive part must be situated at the end of the transparent part.

The brainal mass is transverse, connecting the ocelli and eye-clusters. One may suspect that there is a compensation of at least two neighboring ocelli for the formation of a perspective connected image of an object.

The spherical arrangement of the eyelets of a cluster as they are represented by the eyes of hexapod orders of insects, and in the fossil trilobites necessitate the more conical form of the single eyelet with a very limited range of vision and a divergence of the optical axes. If there is no compensation of neighboring eyelets, or of eyelets of the two clusters with parallel or convergent axes of vision as they really exist in large, prominent clusters, or where the cluster occupy almost the whole head the single eyelet would see only a small part of the object, and the several partial images could not form a truly connected image of the whole object.

The idea of unconnected vision was held by Johannes Müller, and is known as the theory of the mosaic vision, which is, I think, generally re-

jected. The clusters of each side is connected by a rather massive transverse cylinder of nerve- or brain-matter, an apparently unnecessary arrangement—if the cluster or some of their respective eyelet would not co-operate. Such a co-operation would certainly only exist between eyelets with parallel or convergent axes of vision and the clusters would be very large and prominent, exhibiting parallel or convergent eyelets all along the circumference of both the clusters. This is the condition of the eyes in all fast moving insects as in *Cicindela*, *Cistela*, dipterous, neuropterous and lepidopterous insects in their imago state, and these insects avoid collisions by deviating in a distance of several meters, while others, as some Tenebrionidæ and all those living in dark places or moving slowly possess flat lateral clusters, often situated on the inferior surface of the head.

Probably the peripheral eyelets of the large clusters of fast moving insects would be useful for perceiving distant objects and the eyelets nearer the centre of the cluster, single or combined with its neighbor-eyelet, but unable to receive the same rays as the opposite cluster for near lateral objects only.

The movements of the *Cicindela* indicate the use of the peripheral eyelets for a clearer perception of objects. When approached sideways they do not move as quickly away, but turn their front or back towards the approaching object evidently for a clearer inspection. But there is another habit to be considered: one can observe the *Cicindela* for quite a length of time without alarming the insect, but as soon as you move its motions signalize that you are seen. When they are in motion, or the object is in motion, they evidently see quicker. When we look at the sun or other brightly illuminated object and turn our eyes toward a dark surface or close our eyes, we see a number of those bright objects which appear even after we annihilate the images by opening our eyes and closing them again; or, in other words, the retina retains for a certain time the images received. If we admit the existence of the law of the retinal retention of images in the arthropod as well as in the vertebrate eye, the photographer may demonstrate the production of a continued image in the eye clusters by the successive momentary exposure of a fast moving animal to the photographic plates and the effect of the moving series of pictures on our eyes when viewed through a small hole in a piece of pasteboard. We see then only one image of the animal in lively motion. When the image of a moving object falls successively on the retinula of a row of eyelets, or when the insect is in motion exposing the retina of a row of eyelets to the image of an object at rest the effect must be the same.

These are certainly all merely presumptions based on the physiological actions of the vertebrate eye, but I do not see any reason to doubt that the laws and facts of vision in the insect eye be based on different principles. The structure of the compound eye is so different, that one might doubt whether insects see at all or see multiple images or only small parts

of an object, but by applying the retinal compensation and the retention of images a great many otherwise incomprehensible points may become reasonably clear, notwithstanding that we do not know for certain the locality of the projected image as we do on the retina of the vertebrate eye. We surely must be convinced by even the most superficial observation that insects see, and see very sharply. It may be even pardonable to presume that insects are not color blind, and that not merely shades direct their motions.

Accessory assistance by touch or other senses, even mental co-operation ought not, in my opinion, be excluded or flatly denied. Moreover, to call, as some pretentious pastors do, the non-meaning term "instinct" to the assistance of science, is simply covering ignorance and indolence, "denn wo Begriffe fehlen da stellt zur recten Zeit ein Wort sich ein."—Goethe's Faust.

Remark.—Those who have had opportunity to observe blind cave insects and the effect of light on them could furnish valuable suggestions on that subject.

LARVA OF ORNEODES.

By H. G. DYAR.

I am able to add a reference to the Orneodidæ to my article in the February number of the NEWS, pages 38–40. The larvæ were received just too late to make the correction.

From the larval characters, *Orneodes hexadactyla* belongs to the most typical section of the microlepidoptera. I have received also a number of larvæ of Pterophoridæ. Some of them possess the characters of the micros, so that my super-families Microlepidoptera and Anthrocerina are not sharply separated. This indicates that the Orneodidæ and Pterophoridæ are not so very distantly related.

I have also before me the larva of *Heterogynis paradoxa*. As it is an exposed feeder, it has lost the circle of hooks on the prolegs and possesses the structure of the "Macrolepidoptera." Nevertheless, the larval setæ show it to belong to the micros, as do also the characters of venation.

This number contains thirty-six pages.

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